

CONSTRUCTION OF GPT-VANISHING STRUCTURES USING SHAPE DERIVATIVE

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ABSTRACT

The Generalized Polarization Tensors (GPTs) contain significant information on the shape of the domain and its material parameter. The aim of this paper is to provide a method of constructing GPT-vanishing structures using shape derivative for two-dimensional conductivity and anti-plane elasticity problem. We design an optimization approach which solves the problem by minimizing a cost functional. In order to compute the shape derivative of this functional, we rigorously derive an asymptotic expansion of the perturbations of the GPTs that are due to a small deformation of the boundary of the coating. We also present some numerical examples of GPT-vanishing structures for several different shaped inclusions.

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